

# TIMING OF HERBACEOUS WEED CONTROL IN LOWER COASTAL PLAIN LOBLOLLY PINE PLANTATIONS

Harold E. Quicke and Dwight K. Lauer<sup>1</sup>

**Abstract**—Pine response to different post-plant herbaceous weed control timings was evaluated following mechanical (bedding) and chemical site preparation. Results indicate that sizeable productivity gains are possible with site-specific timing of herbaceous weed control treatments. For sites with > 20 percent cover in June of the first year, the best timing for herbaceous weed control was early in the first year of pine growth. For sites with < 10 percent weed cover in June of the first year, the best timing was early in the second year of pine growth. Guidelines for predicting first year June cover are provided.

## INTRODUCTION

A region-wide experiment was installed on a range of soils to examine post-plant herbaceous weed control timing following different site preparation treatments with Chopper® (BASF Corporation, Research Triangle Park, NC) herbicide. Chopper site preparation treatments were applied after bedding and included two application dates (August versus November) and three rates (32, 48, and 64 ounces). Pines were planted in winter following site preparation. Post-plant herbaceous weed-control-timings included: (1) no herbaceous weed control, (2) March of the first year of pine growth (first early), (3) June of the first year of pine growth (first mid), and (4) March of the second year of pine growth (second early).

Recolonization of vegetation was evaluated in June, August, and October of the first pine growing season and June and October of the second growing season. Pines were measured at the end of the first and second growing seasons. Chopper site preparation treatments included Garlon® 4 (Dow Agrosciences, Indianapolis, IN) at 1 or 2 pints for control of blackberry. Herbaceous weed control treatments were 4 ounces Arsenal® (BASF) Applicators Concentrate plus 2 ounces Oust® (E.I. DuPont de Nemours and Company, Wilmington, DE). Site descriptions are provided in table 1.

## RESULTS

### Chopper® + Bedding Provided a Robust Site Preparation Treatment

All Chopper® site preparation treatments controlled woody vegetation and provided reduced levels of herbaceous vegetation that resulted in good growing conditions for crop pines. Woody cover was < 5 percent in June of the first growing season at all locations. Mid-season (August) Chopper® applications improved control of established perennials such as bluestem grasses, swamp sunflower, bracken fern, and sumac. November Chopper® applications and higher Chopper® rates improved control of annuals or perennials that colonized the site after planting, such as fireweed, tall panic grass, and dogfennel.

The value of a single bedding pass plus Chopper® herbicide for site preparation was documented at the Kings Ferry, FL, site. This installation included a site preparation treatment consisting of two bedding passes only (no Chopper® application) for comparison. Without herbaceous weed control, pine stem volume index was 80 cubic inches following bedding plus Chopper® herbicide compared to 35 cubic inches following double bedding (fig. 1). The response to herbaceous weed control following bedding plus Chopper® herbicide was more than 50 percent greater than the response to herbaceous weed control following double bedding (fig. 1).

**Table 1—Summary of study site attributes**

Location	Bedding date	Planting date	Soils <sup>a</sup>
Oakdale, LA	7/25/01	1/14/02	MW to PD silt loam, Glenora/Caddo-Messer series
Kings Ferry, FL	5/18/01	12/7/01	CRIFF A group, PD clay, Meggett series
Green Swamp, NC	5/29/01	2/11/02	VP to PD sandy loam, Nakina/Grifton Series
Mt. Pleasant, GA	6/15/01	2/9/02	CRIFF C group, sandy surface, spodic at 12 to 36", argillic at 30 to 48"

<sup>a</sup> MW=medium-well drained, PD=poorly drained, VP=very poorly drained.

<sup>1</sup> Research Specialist, BASF Corporation, Research Triangle Park, NC 27709; and Research Analyst, Silvics Analytic, Richmond, VA 23238, respectively.

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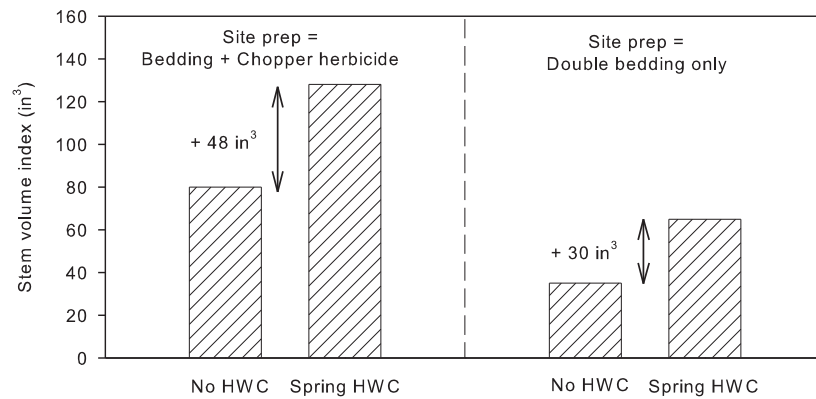


Figure 1—Pine growth after two growing seasons following bedding plus Chopper® herbicide site preparation compared to double bedding only (HWC=Herbaceous weed control).

The use of Chopper® site preparation is very important to performance of herbaceous weed control. Herbaceous weed control on bedded sites without Chopper® site preparation can release woody species that are not adequately controlled by the bedding alone. These uncontrolled woody species will continue to compete aggressively with pines for much of the rotation and can negate many of the benefits of herbaceous weed control (Miller and others 2003).

#### Site-Specific Timing of Arsenal® Plus Oust® Herbaceous Weed Control

Sizable productivity gains are possible with site-specific timing of Arsenal plus Oust® herbaceous weed control following Chopper® herbicide site preparation. Competing vegetation cover in June of the first year of pine growth was a good indicator of the need for first or second year treatment (fig. 2, table 2). For the two sites with > 20 percent vegetation cover

in June of the first year, optimal timing for Arsenal® plus Oust® herbaceous weed control was early in the first year of pine growth. Good pine response to the June application of Arsenal® plus Oust® indicated that herbaceous weeds present later in the growing season do compete aggressively with pines. The Oakdale, LA, site demonstrated that when first-year colonization of herbaceous vegetation is aggressive, application of Arsenal® plus Oust® in June was better than waiting until the second year of pine growth. For the 2 sites with < 10 percent vegetation cover in June of the first year, the optimal timing for Arsenal® plus Oust® herbaceous weed control was the second year of pine growth.

From an operational planning standpoint, Arsenal® plus Oust® herbaceous weed control treatments offer maximum flexibility to managers. This combination of herbicides provides broad-spectrum control of weeds prior to emergence in addition to

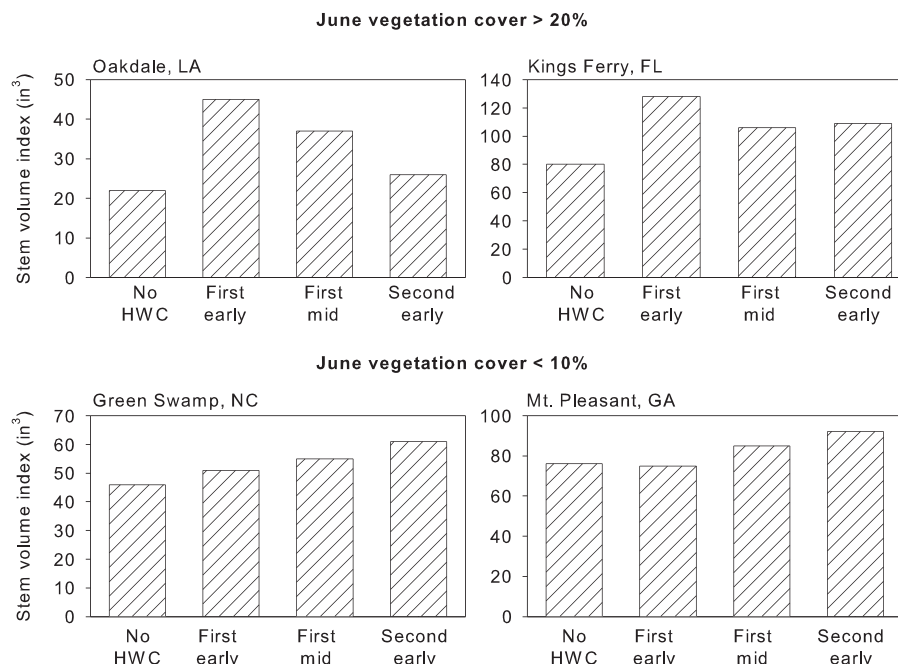


Figure 2—Pine response to different Arsenal plus Oust herbaceous weed control timings following site preparation with Chopper® herbicide.

**Table 2—Total vegetation cover and pine response through the first two growing seasons averaged by herbaceous weed control regime**

Herbaceous treatment timing	Vegetation cover (%)					Pine growth		
	Year 1			Year 2		Dia.	Ht.	Vol.
	June	Aug.	Oct.	June	Oct.			
						(in)	(ft)	(in <sup>3</sup> )
Oakdale, LA								
1. No weed control	27	71	93	85	97	1.1	4.5	22
2. First early	2	13	40	74	92	1.5	5.0	45
3. First mid	27	10	39	71	92	1.4	4.9	37
4. Second early	27	75	95	17	79	1.2	4.3	26
Kings Ferry, FL								
1. No weed control	27	36	46	68	75	1.8	6.7	80
2. First early	4	13	32	57	61	2.2	7.7	128
3. First mid	25	4	12	54	64	2.1	7.1	106
4. Second early	26	38	40	11	38	2.2	6.8	109
Green Swamp, NC								
1. No weed control	4	28	36	72	90	1.5	5.2	46
2. First early	2	10	14	63	88	1.6	5.3	51
3. First mid	4	4	6	61	86	1.6	5.6	55
4. Second early	4	29	37	9	29	1.7	5.3	61
Mt. Pleasant, GA								
1. No weed control	6	12	19	58	62	1.8	6.0	76
2. First early	3	5	7	51	60	1.9	5.7	75
3. First mid	4	3	3	44	57	2.0	6.0	85
4. Second early	4	9	17	7	20	2.1	5.9	92

broad-spectrum control of emerged herbaceous weeds. Arsenal® plus Oust® is tolerated well by loblolly pine in both the first and second years of pine growth. Prescription of herbaceous weed control timing on specific sites is dependent on our ability to predict June vegetation cover in advance. Sites in this study provide a small sampling of competing vegetation development under a limited set of management and environmental conditions. However, results indicate that soil texture is an important indicator of vegetation recolonization following site preparation with Chopper® herbicide. On coarser-textured soils (sandier soils), vegetation recolonization was slower than on finely textured soils (clays).

Other factors also impact vegetation recolonization: (1) Vegetation recolonization was slower following late season bedding (October through November) than following midseason bedding (Lauer and Quicke 2003); (2) Chopper® applied after mid-season bedding resulted in slower vegetation recolonization than Chopper® applied before midseason bedding (Lauer and Quicke 2003); and (3) rainfall patterns will also have an impact, with less rainfall resulting in slower vegetation recolonization.

While more studies installed over multiple years would provide a better inference base, results from this study indicate that immediate productivity benefits are possible with site-specific timing of Arsenal® plus Oust® herbaceous weed control following Chopper® site preparation. The following operations are recommended:

1. Use Chopper® in combination with bedding for site preparation. On sites with established perennial herbaceous species such as brackenfern or broomsedge, apply Chopper® during the active growing season (June through August). On other sites, apply Chopper® any time during the growing season.
2. On sites where vegetation cover is expected to exceed 20 percent by June of the first pine growing season, apply Arsenal plus Oust® early in the first pine growing season. If weather or other circumstances prevent early applications, spray anytime through June.
3. On sites where vegetation cover is expected to be < 10 percent by June of the first pine growing season, apply Arsenal® plus Oust® early in the second year of pine growth. If rainfall or other factors result in weeds developing faster than expected in the first year, spray anytime through June of the first year.

## LITERATURE CITED

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